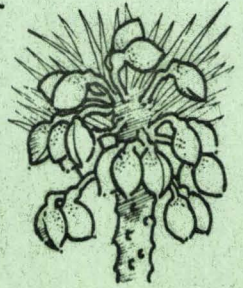




INSECT DISEASE REPORT



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POTENTIAL FOR DEFOLIATION OF PONDEROSA PINE STANDS
BY PINE BUTTERFLY ON THE BITTERROOT AND LOLO NATIONAL
FORESTS, MONTANA IN 1972

by

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Epidemic levels of the pine butterfly, *Neophasia menapia* (Felder and Felder) have been evident in ponderosa pine stands in the Bitter Root Valley since 1969. Evaluations of this infestation were initiated in 1970 to assess overwintering egg populations at 20 locations within the infestation (Ciesla et al. 1971). Defoliation was estimated following the feeding period in 1971 and a linear regression model was computed using defoliation as the dependent variable and egg density as the independent variable (Bousfield and Ciesla 1971). The purpose of this study was to provide a basis for predicting future population levels.

The objective of this evaluation is to test the prediction model, forecast 1972 defoliation potential, and to obtain additional biological information on the infestation.

METHODS

To accomplish the desired objectives an estimate of the population was made using a modification of a sampling system described by Cole (1956). Foliage samples were collected from 16 areas distributed throughout the infested area (Fig. 1). The basic sample unit was a 5-inch branch tip taken from the midcrown of sample trees. Six branch tips were taken from each of 10 ponderosa pines randomly selected from an area. This sampling system gave reasonable standard errors.

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Branch samples were examined for pine butterfly eggs at the laboratory. Totals of both viable and nonviable eggs were recorded for each sample. Viable eggs were easily distinguished from nonviable eggs by color and presence of egg contents. Viable eggs were emerald green and contained a chorion, whereas nonviable eggs were gray with dry contents.

RESULTS AND DISCUSSION

Egg densities per sample were considerably higher in 1971 when compared to 1970. Nine out of the 16 plots showed a significant increase in egg density (Table 1).

The Cow Creek sample station showed the highest egg density of 54.11 per sample, and the lowest density was Upper Lolo Creek at 0.33 eggs per 5-inch branch sample.

Egg mortality appears to have been caused by insect predation. A Pentatomid adult (Family: Hemiptera) was noted feeding on an egg mass in October. Egg predation was relatively uniform between areas ranging from a high of 35 percent at Lolo Creek to a low of 18 percent at Lost Horse Creek (Table 2). Predation was not correlated with egg density (example $r = .201$).

The intensity of the infestation should increase significantly in 1972 and defoliation should be visible on all but 3 of the areas sampled. Past records show that heavy defoliation can cause up to 90 percent tree mortality (Cole 1966).

There are no operational control methods currently available for this defoliator.

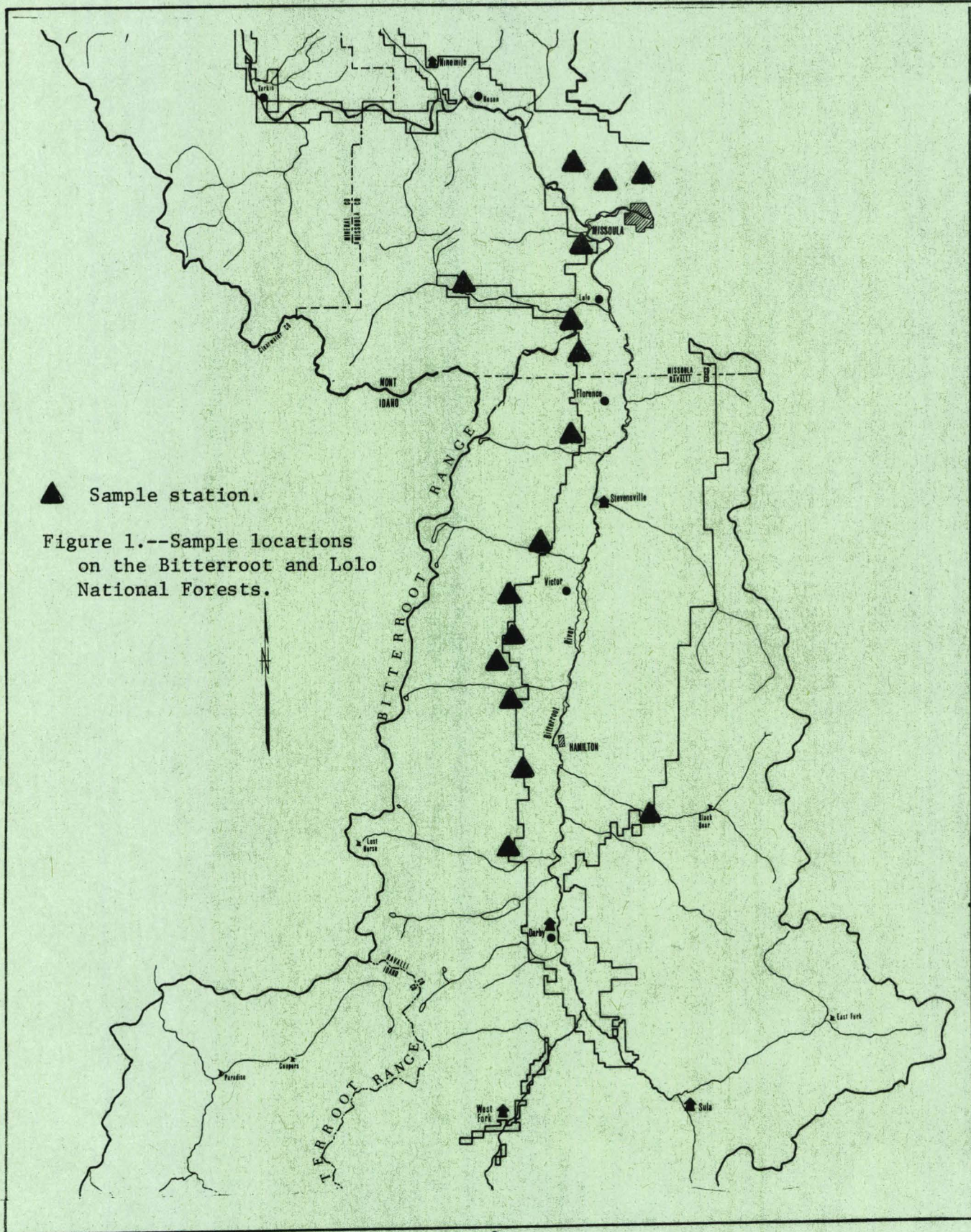


Table 1.--Trend of pine butterfly infestation on the Bitterroot and Lolo National Forests.

Area	Viable eggs per 5-inch branch tip		Predicted ^{a/} defoliation for 1972	Trend
	1970	1971		
BITTERROOT NF				
Fred Burr Cr.	5.64	21.45	22	Increase
Roaring Lion Cr.	8.22	32.53	35	Increase
Blodgett Cr.	41.68	33.01	35	Static
Sheafman Cr. ^{b/}	-	25.88	30	
Cow Creek	46.54	54.11	67	Static
Lost Horse Cr.	7.58	33.87	35	Increase
Big Creek	34.76	50.91	62	Increase
Carlton Creek	6.56	37.38	45	Increase
Larry Creek	46.96	30.06	34	Static
Skalkaho Mtn.	7.78	28.26	31	Increase
LOLO NF				
Lolo Creek	0.26	0.33	0	Static
Mormon Pk. Rd.	14.94	40.30	48	Increase
Grant Creek	22.02	44.73	51	Increase
Blue Mtn.	1.32	3.20	0	Static
Rattlesnake Cr.	16.00	34.45	43	Increase
Edith Cr.	0.0	1.68	0	Static

a/ Percent of trees with visible defoliation.

b/ Not sampled in 1970.

Table 2.--Incidence of pine butterfly egg predation
on the Bitterroot and Lolo National
Forests 1971.

<u>Sample location</u>	<u>Egg densities per 5-inch branch sample</u>		<u>Percent predation</u>
	<u>Total eggs</u>	<u>Viable eggs</u>	
BITTERROOT NF			
Fred Burr Cr.	28.01 $\pm$ 3.79	21.45 $\pm$ 3.25	24
Roaring Lion Cr.	44.50 $\pm$ 5.24	32.53 $\pm$ 4.15	27
Blodgett Cr.	42.70 $\pm$ 4.25	33.01 $\pm$ 4.05	23
Sheafman Cr.	37.78 $\pm$ 3.64	25.88 $\pm$ 3.15	32
Cow Cr.	82.81 $\pm$ 7.96	54.11 $\pm$ 5.86	35
Lost Horse Cr.	41.23 $\pm$ 4.58	33.87 $\pm$ 4.44	18
Big Cr.	68.83 $\pm$ 7.32	50.91 $\pm$ 6.03	26
Carlton Cr.	55.96 $\pm$ 6.62	37.38 $\pm$ 5.24	33
Larry Cr.	43.96 $\pm$ 4.31	30.06 $\pm$ 3.61	32
Skalkaho Mtn.	36.90 $\pm$ 4.31	28.26 $\pm$ 3.43	24
LOLO NF			
Lolo Cr.	0.51 $\pm$ 0.29	0.33 $\pm$ 0.24	35
Mormon Pk. Rd.	56.88 $\pm$ 7.10	40.30 $\pm$ 5.85	29
Grant Cr.	61.30 $\pm$ 7.88	44.73 $\pm$ 5.21	23
Blue Mtn.	3.96 $\pm$ 0.97	3.20 $\pm$ 0.81	19
Rattlesnake Cr.	46.71 $\pm$ 5.37	34.45 $\pm$ 4.48	26
Edith Cr.	2.55 $\pm$ 1.16	1.68 $\pm$ 0.79	34

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